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ABSTRACT

DTU has been given[1] the opportunity to create a world-class facility with a unique suite of 8 electron microscopes, preparation equipment and facilities for image analysis and interpretation; all to be placed in a purpose-built building. This opportunity comes at the beginning of a new era in which several dramatic advances have recently taken place on two fronts. The first is in the field of transmission electron microscopy, TEM: I) As a result of Cs correction and monochromators, high resolution TEM can achieve spatial resolutions of 0.7Å and spectroscopy resolutions of 0.1eV; II) Using image reconstruction from multiple images acquired through 70^{o} tilts, TEM tomography can map nanostructures in 3D; III) Observation of TEM specimens in an environmental cell, at temperature and in a controlled gaseous environment, can provide in-situ observations of gas-solid interactions. The second front is in the field of scanning electron microscopy, SEM, which has already seen major advances due to field emission electron guns, FEG: I) Adding a focussed ion beam, so that specimen surface layers can be removed by controlled sputtering, a dual-beam FEGSEM-FIB allows reconstruction of microstructures in 3D; II) By equipping the FEGSEM-FIB with a detector for electron back scattered diffraction patterns, EBSD, allows 3D mapping of crystallography.

Our building plans are well advanced and include provisions for minimising mechanical and acoustic vibrations, stray magnetic fields and temperature variations in the purpose built rooms of the center. At the same time we are keen to design a pleasant, creative and dynamic working environment for the study of nanostructures, catalysis and materials science research.

[1] *A.P. Møller og Hustru Chastine Mc-Kinney Møllers Fond til almene Formaal* is to donate ~DKK 97.000,000 to establish instruments and building for the Center of Nanoscopy at DTU.